GLOBAL LEARNING AND OBSERVATIONS TO BENEFIT THE ENVIRONMENT

GLOBE *off* LINE

In this issue

GLOBE Offline is produced by NASA's Office of Earth Science.

GLOBE Students Help Their Communities

Community leaders around the world are turning to GLOBE students for their skills and their data in a wide variety of local projects.

Together, park rangers and Kohlberg Elementary GLOBE students used satellite images and ground data to analyze land-use changes in El Paso, Texas.

"While GLOBE students are collecting data for the study of the global environment, immediate local use of these data provides clear benefits to both students and their communities," says GLOBE Program Director Dr. Dixon M. Butler. "One of the wonderful things about Earth science data is that they can be used in many ways."

Working on projects with local organizations gives young people a chance to participate as citizens of their communities. When local scientists, government officials or organizations work with GLOBE students and their data, everyone sees the value of the students' efforts.

Hydrology Is a Natural

GLOBE hydrology measurements are often interesting to communities. Water quality, of course, is important for drinking, as a source of food, and for many household, recreational and commercial purposes.

GLOBE Netherlands recently started linking GLOBE schools with local and regional water boards, which are responsible for monitoring water quality.

According to Yvette Bellens, Netherlands Country Coordinator, water board officials are interested in combining GLOBE student data with their own measurements examining changes in water quality over time. →

"GLOBE students can provide them with extra data or take over part of their tasks," Bellens said. "The students also receive feedback from the water boards."

That kind of feedback is powerful, according to Patty Gaudreau, who, as a fifth-grade GLOBE teacher in Auburn, ME, USA, established a relationship with the water department there. The students, who have been monitoring Lake Auburn, a water source for the region, were impressed that the department's measurements are similar to GLOBE's.

Mary Jane Dillingham, a biologist who is Water Quality Manager for the district, was also impressed. "The kids understand the bigger picture and the relationship between their measurements and the ecology of the lake," Dillingham said. "They're a cut above [other students] in terms of understanding the relationships between pH, water temperature, and water quality."

Dillingham added that GLOBE enhances the water district's education and conservation efforts. The lake is vulnerable to pollution, so monitoring and conservation efforts are crucial. "These kids have a different respect for water quality and for the environment in general. That's really the way we're going to protect Lake Auburn," she said.

State of California Fish and Game wardens have also come to depend on GLOBE student data to monitor several locations on Lake Earl in the Elk Creek Wildlife Area near Crescent City. Warden Don Kelly said that for the past 5 years they have used hydrology data from the seventh-graders at Crescent Elk School.

And earlier this year, GLOBE students in Bahrain, Jordan, and Lebanon began monitoring coastal areas in the Arabian Gulf, the Red Sea, and the Mediterranean Sea. Other students in the region may soon join this Middle East Hydrology Research Project. The students are measuring seawater quality in industrial, tourist, urban, and ecologically protected areas and will be sharing their results with people in those areas.

"This is a chance for us to compare the different types of shores and the physio-chemical factors that affect land and sea," says Zakeya Ali, Bahrain's GLOBE Country Coordinator and a leader of the study. The cross-cultural group has already convened in February and in July and plans to add land cover studies as well.

To classify how land is used, GLOBE scientists, educators, and students use an adaptation of the international system called the Modified UNESCO Classification or "MUC" system.

GLOBE schools that conduct land cover protocols usually evaluate a 15 km X 15 km site using the MUC system.

Land Cover/Biology Too

As populations grow and shift, land use planners try to guide new development to preserve a good quality of life. To do this, they need data about their communities and natural areas nearby. Recently, GLOBE land cover studies have caught the eye of several officials.

On Cape Cod, MA, USA, one enterprising Tabor Academy student used the GLOBE MUC guide to compare his observations of his hometown with satellite images. Using Geographic Information Systems (GIS) software (which can add information such as population, water quality, and other statistics to maps) GLOBE student Colin Haley hoped his work would help town officials plan development, a major concern for residents.

Dr. Russell Congalton, GLOBE's principal investigator for Land Cover/Biology, said Haley's maps could be invaluable to his community. "They'll have some data that could help them think about 'intelligent development.'" Congalton said. "What we're seeing here is GLOBE interacting with the community."

Town officials in Marana, AZ, USA, would agree. After hearing of their high school's GLOBE land cover studies, in which students completed a 100-square mile (approx. 275-square km) land cover project in the southern Arizona desert, the town turned to the students for help. The students will use their remote sensing and "ground-truthing" skills in two projects: development of a pedestrian-and-bike path system near local schools and an analysis of bus routes.

Kevin Sweeney, the GIS Manager of Development Services for Marana, said he is excited about cooperating with the GLOBE students. "This is a high-growth community, so we're under pressure to determine what the safest locations are so kids can walk or ride their bikes to school," Sweeney said. "The town's put a lot of effort into acquiring photo imagery, but there's quite a bit of data collection needed."

Gary Campbell, a Marana High School teacher who has developed an advanced science course based on GLOBE activities, said students also benefit from the projects.

"The kids learn how to use the equipment, do research, process the data, write up the results, and know what they did was useful and valuable," Campbell said. "I also hope they are exposed to vocational situations that might appeal to them, no matter the level of education they complete."

Your Action:

If your GLOBE students are using their data to help the local community, please send information on that to info@globe.gov, attention of "Community."

Cultivating Science Education With

GLOBE has joined with Team Ag☆Ed, a national organization that supports science and math education in an agricultural context. Both partners hope to enable more U.S. students to experience GLOBE.

Team Ag☆Ed is composed of the National FFA Organization, the National Council for Agricultural Education and the National Association for Agricultural Educators.

Agriculture combines principles of physical, chemical, and biological sciences in the production and processing of food and fiber. As agriculture has become more sophisticated, hands-on science and math have become more important in preparing students for careers in agricultural fields.

"GLOBE and agricultural education both espouse experiential learning, so the connection with GLOBE is a natural," said Dr. Carol Conroy, GLOBE's Chief Educator and Director for U.S. Partnerships.

The Team Ag☆Ed partners agree. Anna Melodia, Director of the Education Division at National FFA, said GLOBE helps Team Ag☆Ed support agriculture teachers with integrated models for classroom instruction and experiential learning, what Team Ag☆Ed calls Supervised Agricultural Experiences (SAEs).

Melodia pointed out that agricultural science and agricultural education are wide ranging. A full 20 percent of the American workforce is involved in the broader agriculture, food, fiber, and natural resources sectors of the economy. Only about 2 percent of agricultural workers are in what is traditionally thought of as farming production. The rest are in fields as diverse as aquaculture, landscaping, soil, plant or environmental sciences, animal science, and forestry. Furthermore "ag" students are found equally in urban, suburban, and rural areas.

"GLOBE makes connections for students in science and math in a way that is practical and real…and [can help] improve results in those areas," Melodia says. "The practical application of scientific method, data collection, and analysis will make the scientific disciplines become real, important, interesting, and even fun for students. As I see it, our involvement in this program provides benefits to strengthen our SAE and FFA involvement, makes connections with and supports education in science and math, encourages cross-disciplinary study, and makes global connections."

The GLOBE–Team Ag☆Ed Partnership will work with already established partners in local areas to help recruit, train, and support agriculture teachers. In some cases, where there are no or few local partners, teachers will learn about GLOBE through Team Ag☆Ed affiliated activities. Team Ag☆Ed is working with GLOBE and several partners in Oregon, Indiana, and Arizona to secure grants to fund: (1) a national training team to work exclusively with agriculture teachers or agriculture-science teacher teams and (2) development of a model to integrate GLOBE into national agricultural education curriculum initiatives like Team Ag☆Ed's SAEs and the Student AgriScience Fair competition.

Team Ag☆Ed students are now doing GLOBE protocols.

Your Action:

To find out more about using GLOBE in agricultural education or FFA activities or to find out more about GLOBE–Team Ag☆Ed Partnership programs, send eMail to amelodia@ffa.org or cconroy@globe.gov.

Computers, Teachers, Higher Level Activities Boost Student Science Scores

Elementary and secondary school students benefit from taking higher level science courses and using computers, according to a recent survey by the United States National Center for Education Statistics.

Many students have trouble grappling with scientific questions, the survey revealed. But the survey results and evaluations of the GLOBE Program also suggest that GLOBE can be a great help for students in learning science.

"The Nation's Report Card" on science by the National Assessment of Educational Progress (NAEP), shows that the average scores of U.S. fourth- and eighth-graders were essentially unchanged from 1996 to 2000, and the scores for twelfth-graders declined by a significant 3 points.

But students did well in science under certain circumstances. The NAEP survey examined the relationships between student performance and teacher education, classroom computer use, and coursework, finding that all three factors influence student performance.

The importance of these factors underscores how effective programs like GLOBE can be in helping students understand science. Although the NAEP did not cite any specific program, evaluations of GLOBE have shown that students' science skills are enhanced by meaningful participation in the program.

An evaluation of GLOBE by SRI International, a top education evaluation organization, shows that "when well implemented by skilled teachers, GLOBE has a positive impact on students' ability to do science and interpret scientific data." GLOBE teachers report that the program helps their students' scientific understanding on many levels. They say their students' observational skills, measurement skills, ability to work in small groups, and technology skills improved thanks to GLOBE.

SRI evaluators note that reported improvements were even greater when teachers went beyond taking measurements and used GLOBE learning activities or had students analyze and interpret the data. They also found that GLOBE students are more likely than nonparticipating students to be interested in science careers.

"Both observations of GLOBE students' activities and structured assessment of student knowledge suggest that GLOBE can have a positive impact on students' ability to collect and interpret scientific data in classes where the program is implemented to a significant degree," according to SRI's report.

for example…

8th graders

…whose teachers had students use computers for simulations and models or for data analysis scored higher, on average, than eighth-graders whose teachers did not.

Fourth-graders whose teachers had students use computers to play learning games scored higher, on average, than fourth-graders whose teachers did not.

Eighth-graders whose teachers reported having students work together on science activities weekly had higher average scores than students whose teachers had them do so daily, monthly, never, or hardly ever.

Fourth-graders whose teachers reported having students work together on science activities daily or weekly had higher average scores than those who did so less frequently.

Your Action:

For more on GLOBE evaluations and alignment with standards, go to www.globe.gov, and click on "Educators Corner" on the Navigation Bar.

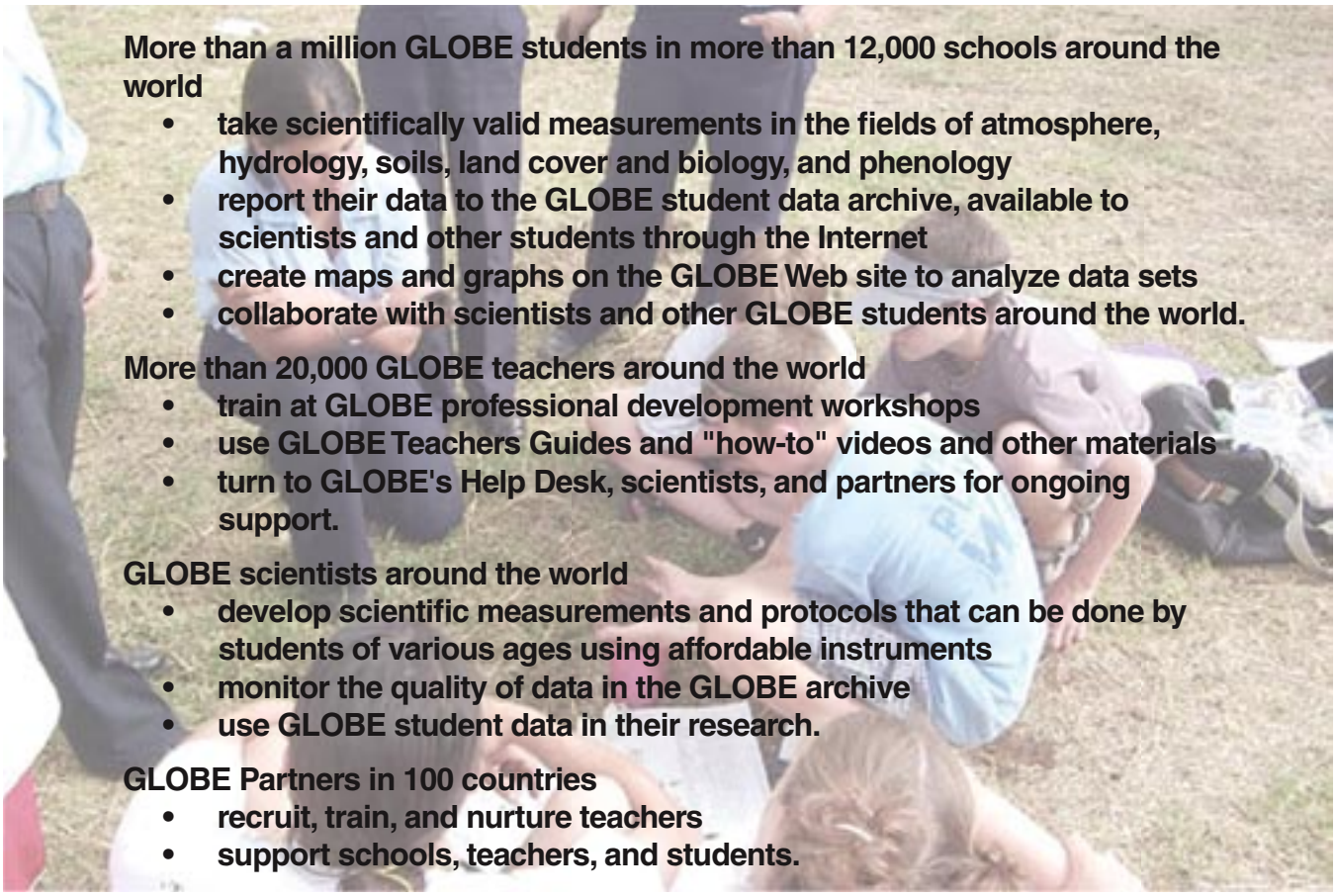
The GLOBE Program
www.globe.gov

GLOBE is a worldwide, hands-on, school based science and education program. In the United States, GLOBE is a federal interagency program sponsored by NASA and the National Science Foundation with support by the Department of State. More than 140 colleges and universities, state and local school systems, and nongovernmental organizations are partners in GLOBE implementation and take responsibility for recruiting, training, and supporting GLOBE teachers and schools. Internationally, GLOBE is a partnership among the U.S. and 100 other countries.

GLOBE has been adopted by schools in every state in the U.S. Educators hail the program for its usefulness in improving children's science and math achievement and geography and technology skills. Teachers, states, and local school boards turn to GLOBE to meet education goals and standards.

GLOBE improves students' scientific understanding by involving them in real science—taking measurements, analyzing data, and participating in research with scientists. Students' awareness of environmental issues comes from a scientific viewpoint, rather than from an advocacy or issues orientation. Studies of the program show that GLOBE students are more interested than many in pursuing science in higher education and as a career.

Nobel laureate physicist Dr. Leon Lederman calls GLOBE "the quintessentially ideal program for involving kids in science."



More than a million GLOBE students in more than 12,000 schools around the world

- take scientifically valid measurements in the fields of atmosphere, hydrology, soils, land cover and biology, and phenology
- report their data to the GLOBE student data archive, available to scientists and other students through the Internet
- create maps and graphs on the GLOBE Web site to analyze data sets
- collaborate with scientists and other GLOBE students around the world.

More than 20,000 GLOBE teachers around the world

- train at GLOBE professional development workshops
- use GLOBE Teachers Guides and "how-to" videos and other materials
- turn to GLOBE's Help Desk, scientists, and partners for ongoing support.

GLOBE scientists around the world

- develop scientific measurements and protocols that can be done by students of various ages using affordable instruments
- monitor the quality of data in the GLOBE archive
- use GLOBE student data in their research.

GLOBE Partners in 100 countries

- recruit, train, and nurture teachers
- support schools, teachers, and students.

Scientific Instruments for GLOBE Measurements

Each investigation requires use of accurate, reliable, and calibrated instruments that meet specifications developed by GLOBE scientists to assure consistent and accurate measurements for use by the international environmental science community. Specifications are included in the *GLOBE Teacher's Guide* that teachers receive at GLOBE Workshops.

SKILL LEVEL KEY
P = primary school
M = middle school
S = secondary school

Field of Study: Atmosphere and Climate

MEASUREMENT	INSTRUMENT	SKILL LEVEL
Cloud cover, cloud type	GLOBE Cloud Chart	All
Aerosol	GLOBE Sun Photometer	M and S
Barometric pressure	Aneroid barometer or altimeter	All
Relative humidity	Sling psychrometer or digital hygrometer	All
Precipitation, liquid	Rain gauge	All
Precipitation, solid	Snow board, rain gauge, snow depth pole	All
Precipitation, pH	pH indicator paper	All
	pH pen, pH 7 buffer, distilled water	M and S
	pH meter, pH 4, 7, 10 buffers, distilled water	M and S
Air temperature: maximum, minimum, and current	Digital multiday, digital single day, or horseshoe shaped max/min thermometer, calibration thermometer, instrument shelter	All
Ozone	Ozone strip scanner, ozone test strips, instrument shelter	All

Field of Study: Land Cover and Biology

MEASUREMENT	INSTRUMENT	SKILL LEVEL
Land cover, sample site and biometry	GPS receiver, student made clinometer and densiometer, camera, compass, satellite image, 50-m tape measure, *MUC Field Guide* or *MUC Glossary of Terms* (provided), local vegetation identification guides, paper bags, grass shears, plant drying oven for grasslands, beanbag, balance or scale	All
Manual land cover mapping	Clear plastic sheets, felt-tip markers, *MUC Field Guide* or *MUC Glossary of Terms,* satellite image	All
Clustering (computer) land cover mapping	Computer, MultiSpec, satellite image on disk, *MUC Field Guide* or *MUC Glossary of Terms*	All
Land cover change detection	Computer, MultiSpec, two coregistered satellite images—one recent, one older—*MUC Field Guide* or *MUC Glossary of Terms*	All

Field of Study: Hydrology

MEASUREMENT	INSTRUMENT	SKILL LEVEL
Transparency	Turbidity tube or Secchi disk, 5-meter rope	All
Water temperature	Organic liquid-filled thermometer	All
Dissolved oxygen	Dissolved oxygen kit	All
Water pH	pH indicator paper	P
	pH pen, pH 7 buffer, distilled water	M and S
	pH meter, pH 4, 7, 10 buffers, distilled water	M and S
Electrical conductivity—fresh water	Total dissolved solids tester, calibration solution	All
Salinity—brackish water and saltwater	Hydrometer, 500-ml clear plastic graduated cylinder, organic liquid-filled thermometer (Optional—salinity kit for titration method)	All (M and S)
Alkalinity	Water alkalinity kit	M and S
Nitrate	Water nitrate kit	M and S

Field of Study: Soil

MEASUREMENT	INSTRUMENT	SKILL LEVEL
Soil temperature	Soil thermometer—digital multiday or single day max/min thermometer	All
Soil moisture	Balance, meter stick, drying oven, soil auger, 50-m tape measure, sample containers (Optional—moisture meter and blocks, gypsum, PVC piping)	All (S)
Field characterization: color, slope, consistence, structure, texture, carbonates	Color chart, meter stick, camera, student made clinometer, vinegar, spray bottle	All
Lab characterization: fertility, pH, bulk density, particle size distribution, particle density	Drying oven; 100- and 500-ml graduated cylinders; soil NPK kit; hydrometer; squirt bottle; pH buffers; thermometer; dispersing solution; pH paper, pen, or meter; 100-ml volumetric flasks; hot plate or other heat source; distilled water; balance	All
Infiltration	Dual ring infiltrometer	All

Field of Study: Phenology

MEASUREMENT	INSTRUMENT	SKILL LEVEL
Green-up	Ruler, camera, flagging tape, or marking stakes	All
Green-down	GLOBE Pantone color guide, camera, flagging tape, or marking stakes	All
Budburst	Flagging tape, markers	All
Ruby throated hummingbirds	Camera, hummingbird feeder and food (optional), hummingbird garden (optional)	M and S

Publishing Student Research on the GLOBE Web Site

Just like professional scientists, GLOBE students can share their research with the rest of the world by posting their projects on the GLOBE Web site. GLOBE highly encourages you to use this tool. Through investigation projects, students do science. They learn about the importance of asking questions, analyzing data, drawing conclusions, and reporting results.

Submitting a report on your work is easy. Just go to the "Student Investigation" page on the GLOBE navigation bar and follow the instructions. Here are some helpful guidelines.

- The project needs to include GLOBE data, but it can include other data as well.
- Follow the report format. A link to the instructions is given on the "Student Investigation" Web page. Students must include an abstract, research question or hypothesis, method, data summary, analysis, conclusion, discussion, and bibliography if references are made.
- Remember, disproving a hypothesis is just as important as supporting one. If students follow the report format, then encourage the students to share their work, regardless of the outcome.
- Reports can be submitted on the online form or by attaching reports with the following formats.

  HTML
  Microsoft Word™
  Corel Word Perfect™
  Rich Text Format (RTF)
  Adobe™ PDF

Publishing on the GLOBE Web site as part of the *GLOBE Student Journal* can be made a part of a student's research project. A written submission can serve as his or her (or a team's) final project for evaluation and documentation of their work. The *GLOBE Student Journal* is not peer reviewed, so GLOBE counts on teachers to review student work before submission. That review helps ensure that the papers reflect well on the students, their teachers, their schools, and GLOBE.

How To Mark Your Local Growing Season

The period between "green-up" and "green-down" is, essentially, the growing season. For the most part, scientists use satellite data to determine green-down and green-up because on-the-ground plant observations are expensive and time consuming. Therefore, GLOBE Green-Up and Green-Down Protocols can provide important validations of satellite data. In the spring, the Green-Up Protocol is nicely paired with the Budburst Protocol.

See the *Teacher's Guide* or www.globe.gov for more information on these protocols.

Here are ways to ensure your Green-Up and Green-Down observations are accurate and, therefore, useful to scientists.

- The trees, shrubs, or grasses you observe should be species that are common and, if possible, native to your area.
- When measuring the lengths of the leaves, be sure to use a millimeter ruler. Remember, all GLOBE measurements are metric.
- To make sure a leaf has reached its maximum length, you need at least two measurements of the same length. Only then will you know the leaf has stopped growing.
- The plant you observe should not be watered or fertilized. Plants growing naturally respond to seasonal and climate changes in certain ways. Tending plants disrupts that, and their growth will not reflect local climate and conditions.
- Your observations should be done on one of the dominant deciduous canopy species. If you cannot reach the canopy, study the dominant understory species. Examining the understory still gives a valid ground indication of what overstory species are doing in response to the favorable soil and climate conditions in the spring or declining conditions of the fall. Comparing understory to overstory is also a good inquiry for students.
- The Green-Up and Green-Down Protocols ask for observations twice a week. In the spring, when budburst is near, we encourage you to increase your observations to every day.
- Green-Up and Green-Down can be done by different classes. If you do Green-Down in the fall, it is not necessary to observe the exact branches or grass plot for Green-Up in the spring. But do be sure to observe the same species at the same site.
- When doing Green-Down, choose the dominant color that is the best match on the GLOBE Plant Color Guide. It is not necessary to have an exact color match.
- Although you are focusing on specific plants, it is always a good idea to observe what the general pattern is in your area. For instance, is your tree having budburst at around the same time as the other trees of the same species? If not, why not?

Letters From Finland

Dear GLOBE,

I work as a biology teacher in a small secondary school in the northeastern part of Finland near the Russian border. I have been involved in the GLOBE program since 1996 and have been very proud of it.

In my opinion the best thing about the GLOBE project is that students get a better, long-term chance to study outside, instead of theoretical studies inside the classrooms. That makes it much easier for me to motivate the students to study the environment around them.

Because students have to make regular observations about clouds, rainfall, and air temperature every day, they get used to it and automatically observe the weather even on their holidays. I think it helps them to learn more about the nature around and even respect it more. If it works out, so I have succeeded in achieving my main purpose as a teacher.

Responsibility and punctuality are abilities that can also be improved while working in the project. One of our ambitious aims is to keep making and reporting our observations as regularly as we have done so far. The other aim is to write a weather report in time, which will be published in the local newspaper at the end of each month.

As a teacher I can easily make good use of all the data taken by GLOBE schools all over the world, which gives me workable instruments to illustrate the complicated weather factors in different parts of the world.

I am always looking forward to the seminars arranged by the Finnish GLOBE organization. It is very rewarding to meet there colleagues that have common interests and, of course, learn more, for example, about the GLOBE protocols.

One of the highlights to me and my students was when we many years ago were able to travel abroad to Zwolle, Holland, and meet our GLOBE friends, with whom we earlier have had chats before, through Internet.

We have also made together some Internet WWW pages, in which we introduce our work in the GLOBE program. Unfortunately most of them are written in Finnish, but you can look at the diagrams anyway. Our Home Page is to be found at the URL address: http://edu.suomussalmi.fi/lukio/globe/

René Kajava, a Globe teacher from Suomussalmi High School, Ämmänsaari, Finland.

Dear GLOBE,

Lintumetsän koulu is a new school for pupils between 13-16 years of age and located in Espoo, Finland, 14 kilometres from Helsinki.

During the autumn of 1998 we established our weather station. We contacted the Finnish National Meteorological Institute to get some equipment. They sold us used, but still working and calibrated, maximum and minimum thermometers, a rain gauge, and a hydrometer. We continued by restoring an old shelter for thermometers.

Almost every pupil in our school has been helping the project to go on. This is possible because we have a compulsory course called "Science and the Environment." During this course one group goes to the field to read the maximum and minimum temperatures, the snow, and the rainfall. At midday another group reads the temperature and identifies the cloud type and estimates the cloud cover. They also make the phenological observations. Groups in Chemistry go to the water and water samples.

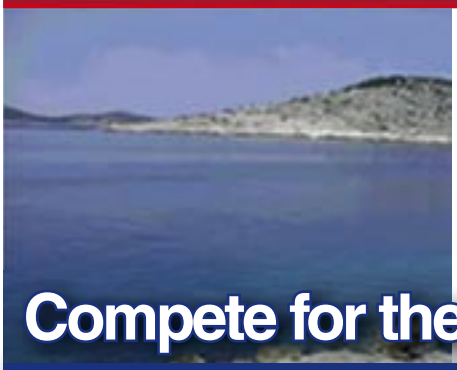
In the future we will continue these weather observations. To get more phenological data we have planted bushes in our schoolyard (Syringa vulgaris and Lonicera tatarica). Last autumn we have observed the fall of the leaves for the first time. Next year we are going to study our nearby forest, the cover of the vegetation, and the nature of the soil.

The pupils in grades 8B, 8D, and 8F at Lintumetsän koulu (Lintumetsä school), Espoo, Finland.

Your Action:

If your school wishes to submit a brief article on its GLOBE work, please eMail it to info@globe.gov. We will publish selected articles on the GLOBE Web site or in a future *Offline.*

2003 GLE GLOBE



Compete for the 2003 GLOBE Learning Expedition!

The Island of Obonjan, known also as the Island of Youth, lies 6 miles from Šibenik, west of the island of Zlarin. The island is 1800 m long, with an area of 70 hectares. Its highest peak is 62 meters above sea level. It is covered in Mediterranean vegetation and pine trees, and there are still traces of olive groves, fig trees, and vineyards that used to thrive here. The coastline is a string of bays, coves, cliffs, rocks and shallow waters with many great spots for swimming.

Located on the Adriatic coast of Croatia, Šibenik is a beautiful and historic city. It is first mentioned in AD 1066, as a dwelling for King Petar Kresimir IV. The old town section is full of narrow streets and stairs connecting open courtyards. The area has a typical Mediterranean climate with cool rainy winters and warm sunny summers. Average temperatures range betweeen 6.7°C in winter and 27°C in summer. Average rainfall is 340 mm in winter and 120 mm in summer.

The Krka National Park occupies 111 km^2 along the course of the Krka River, 2 km downstream from Knin to Skradin, and the lower course of the Cikola. The 72 km long Krka River rises at the foot of Mt. Dinara not far from Knin. In this short run are seven spectacular travertine waterfalls including the beautiful Skradinski buk, where we will do our field work. Skradinski buk is a cascading falls consisting of 17 steps and a total drop of over 45 meters.

The GLOBE Program-US will select 10 student teams to represent the US in Croatia for the 2003 GLOBE Learning Expedition (GLE) in Šibenik. This international student-teacher conference will be a forum for student research teams to present their project results. Students will have a chance to experience (and measure) a new environment, to meet other GLOBE students from around the world, and to learn from each other and from GLOBE scientists.

GLOBE will select the teams based on written presentations of student research projects. Selected papers will cover the range of GLOBE measurements and represent the diverse regions and communities of the United States. Each team will consist of two to four students accompanied by a teacher-chaperone. GLOBE will arrange for partial support of the winners' costs to attend the 2003 GLE.

Requirements

Team size	2–4 students and teacher
Student age	At least 12 years old by May 31, 2003
Student grade	In grades 7 through 12 in the 2002–2003 school year
Research projects	Projects must use GLOBE data or involve the application of GLOBE protocols to address a research question posed by students.
Written reports	Be sure that your report follows the GLE Student Investigation Report Guidelines for Report Format, which can be found on the Internet at www.globe.gov.
Due date of reports	January 31, 2003
Selection announced	By March 15, 2003

Your Action:

For more information about the GLE and how to apply, follow the GLE links at www.globe.gov.

New Protocols, New Leadership Mark Seventh Annual GLOBE Conference

Success in the field and in the classroom and a vision for the future were hallmarks of the Seventh Annual GLOBE conference in Chicago, IL, USA, this summer.

Dr. Dixon M. Butler, new GLOBE Director

The conference was organized by both U.S. and International Partners, which shared papers and posters, as well as ideas for more effective program implementation. GLOBE introduced 11 new science investigation teams. Scientists presented papers that are strong examples of how GLOBE data are used in research.

Mike White of Utah State University and Bill Hilton of the Hilton Pond Center for Piedmont Natural History—the key scientists behind the Budburst and Humming Bird Special measurements—have been selected by the National Science Foundation as GLOBE principal investigators. These measurements will now join the permanent set of GLOBE protocols.

Dr. Dixon Butler addressed the meeting as GLOBE's new director and announced that the National Aeronautic and Space Administration (NASA) is assuming lead agency responsibility.

"It's exciting to see such accomplishments from around the world," Butler said. "With the support of NASA and a common vision from our partners, the GLOBE office can set priorities for the future."

The GLOBE Program
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An International Environmental, Educational, and Science Partnership ®

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